

## REMARKS

In the outstanding Action, the Patent Office rejects claims 1-2, 4-9, 11-12, 14 and 17-18 under 35 USC § 112, first paragraph, as allegedly lacking support for the words "in a single step." Applicants respectfully disagree with the Examiner's rejection. However, these words have been deleted from the claims in the interest of advancing the prosecution of the subject application.

The Examiner also rejects claims 1-2, 4-9, 11-12, 14 and 17-18 under 35 USC § 103(a) as being unpatentable over US Patent 5,250,360 (Andrus et al.) in view of US 2004/0068027 (Daly et al.) or U 2004/0063817 (Ilenda et al.). Lastly, the Examiner rejects claims 1-2, 4-9 and 11-14 under 35 USC § 103(a) as being obvious over US Patent 6,531,524 (Ring et al.) in view of US2004/0115477 (Nesbitt).

The above rejections are also respectfully disagreed with, and are traversed below.

Andrus et al. relate to a specific composition comprising a barium silicate or strontium silicate glass-ceramic material.

At column 6, Andrus et al. describe that its glass powder-coated metal body is 1) heated to a temperature below 1000°C to soften the glass particles and produce a dense, smooth, continuous glass coating that is essentially free from crystallization. The glass coated body is then heated to a 2) somewhat higher temperature to effect development of a crystal phase which forms a dense, strong, refractory, crystalline coating. "A key feature of this procedure is the ability to control the timing of crystallization, and thus the reproducibility of the coating process." Thus, the second, higher temperature effects development of the crystal phase, according to Andrus et al.

In contrast, in embodiments of Applicants' invention, the applied powder is heated to only one temperature, wherein the heating to this one temperature melts and fuses particles of the

powder coating to the gas turbine engine component solid surface and cures the powder coating. Advantageously, Applicants can thus raise the melting point without softening of the matrix.

Andrus et al. do not disclose or suggest all of Applicants' claimed features.

At page 4 of the outstanding Action, the Examiner cites col. 3, lines 25-43 of Andrus et al. and alleges:

"In the alternative, Andrus teaches that the invention seeks to improve upon conventional methods of protecting turbine components which failed to permit the glass coating material to soften and flow into a continuous glass coating before firing (col. 3, ln. 25-43). As such, Andrus teaches that heating of the glass frit powder coating without a preheating step is a conventional and well known method for forming the coating making the claim limitation obvious ...."

Applicants respectfully point out that col. 3, lines 25-43 of Andrus et al. recite:

"... The invention is based, to a considerable degree, on our discovery that certain additives have an unusual effect on the crystallization properties of thermally crystallizable, barium silicate and strontium silicate glasses. In particular, these additives permit the glass to soften and flow into a continuous, glassy coating before sufficient crystallization occurs to impede flow. Absent at least one of these additives, the glass tends to stiffen by crystallization before complete coverage occurs ..." [Emphasis added].

Thus, the improvement Andrus et al. is referring to in the above passage is the addition of "certain additives" which permit the glass to soften and flow.

The addition of Daly et al. and/or Illenda et al. do not cure the shortcomings of Andrus et al. In particular, Daly et al. relate to a low gloss powder coating, which is applied to hardwood

substrates. Daly et al. do not relate to any method of coating gas turbine engine superalloy components as claimed herein.

Ilenda et al. relate to coatings resistant to damage from stresses caused by sunlight, chemical spills and adverse weather conditions (paragraph 1 of Ilenda et al.). As in the case of Daly et al., Ilenda et al. do not relate to any method of coating gas turbine engine components, as claimed herein. The articles to be coated by the Ilenda et al. coating include, for example, polyolefin pipes, luggage, automotive parts, prepegs for printed circuit boards (see paragraph 12 of Ilenda et al). Thus, the skilled artisan would not be motivated to even look to these references for guidance.

In view of the foregoing, the Examiner's rejections based upon Andrus et al., Daley et al. and Ilenda et al. should be reconsidered and withdrawn.

Regarding the Examiner's rejection based upon Nesbitt and Ring et al., Nesbitt discloses the application of dry particles to a layer of wet bonding material applied to a substrate. The wet bonding material includes an additive or agent, such as a resin. (Paragraph [0023]). The layers are then cured. (Paragraph [0035]). Thus, Nesbitt requires the interaction of a wet bonding layer and the dry particle layer to achieve its cured layered system. As disclosed at Page 3, paragraph [0020], Nesbitt is particularly directed to a coating reinforcing underlayment for coating substrates. This underlayment includes the wet bonding material described above. Nesbitt further discloses at Page 20, paragraph [0178], that the underlayment can be used as a single process without any topcoats to provide adhesion of paper or grip or tractive strength as related to moving paper or other products with a roller at high speeds.

At Paragraph [0147], Nesbitt discloses the use of tribocharged powder technology to enhance the dry particle attachment or adherence to the wet bonding material layer, particularly in odd-shaped configurations. Nesbitt requires the use of its wet bonding material layer to which its dry particles adhere. As in the case of Andrus et al., Nesbitt fails to disclose or suggest Applicants' method to produce a higher melting point coating resulting is higher

engine use temperatures including the application of powder coating comprising a fritted glass matrix with ceramic particles trapped in the matrix.

Nesbitt does not teach or suggest that a powder coating technique as claimed herein can be employed to coat gas turbine engine components.

The addition of the Ring et al. reference does not cure the shortcomings of Nesbitt. That is, Ring et al. merely disclose various powder coating compositions relating to the reduction of gloss. Ring et al. appear to be particularly related to paint compositions (see Background and Summary). Ring et al. do not disclose or suggest the use of any powder coating compositions to protect gas turbine engine components, as claimed herein. Ring et al. merely disclose that powder coatings are generally applied by an electrostatic spray process (see Field section).

The Examiner contends at page 7 of the Action that it “would have been obvious to one of ordinary skill in the art at the time of the invention recognized (sic) that the method of coating substrates as taught by Ring could have been employed in coating a wide variety of substrates including turbine engine components such as is taught by Nesbitt.”

Applicants respectfully disagree with the Examiner’s rejection. The method of coating substrates as taught by Ring et al. refers to “powder coating manufacturing methods allow[ing] the manufacturer to offer commercially a range of full gloss coatings in a variety of colors. The range of products available in different finishes is, however, limited.” Col. 1, lines 50-54 of Ring et al. Ring et al. then go on to address the need for a variety of “aesthetic finishes, including a range of reduced-gloss finishes .....” Col. 3, lines 33-37. Ring et al. further discuss the use of coloring agents (Col. 4) and appearance modifying additives (Col. 4). Accordingly, the variety of substrates that Ring et al. would suggest to the skilled artisan would be those aesthetically in need of, eg. a reduced-gloss finish, and not gas turbine engine components coated by the method claimed herein. Moreover, Ring et al. do not disclose or suggest to the skilled artisan a coating, which when heated has a raised melting point temperature, resulting in a higher engine use temperature, as claimed herein. Ring et al. do not relate to raising the melting point of a gas turbine engine coating so that the component

has a higher engine use temperature. Applicants' do not claim a method of painting any substrates to achieve a reduced-gloss finish or any method of painting.

It is asserted that there is no teaching, suggestion or motivation that would lead one of ordinary skill in the art seeking to develop that which Applicants claim to combine and then modify the teachings of the afore-cited references in an attempt to arrive at the subject claims. It is respectfully asserted that the TSM test provides helpful insights into the nonobviousness of the subject claims.

Thus, in an objective analysis considering the scope and content of the afore-cited art, the level of ordinary skill in the art, and the differences between the claimed invention and the prior art, it is respectfully asserted that the Examiner's obviousness rejections should be reconsidered and withdrawn.

The Examiner is respectfully requested to reconsider and withdraw the outstanding rejections in view of the foregoing.

Newly added claims 19-22 are also believed to be patentable in view of the cited references. For example, the afore-described references do not disclose or suggest Applicants' method "consisting of" the particular steps recited in independent claim 21. Nor do the references disclose or suggest Applicants' claimed method wherein the component is coated and heated in less than 15 minutes. See, e.g., page 12 of Applicants' specification.

Similarly, newly added claim 23, which is supported by, e.g., page 7 of Applicants' specification, and claim 24 depending directly therefrom are also believed to be patentable in view of the cited references. In these claims, the powder coating advantageously comprises a ceramic matrix admixed with metal.

All issues raised by the Examiner having been addressed, the subject application is believed to be in condition for immediate allowance. Accordingly, such favorable action is requested.

A call to the undersigned attorney at the telephone number listed below would be sincerely appreciated should the Examiner have any questions or believe a discussion would advance the prosecution of the subject application.

Respectfully submitted:

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